intention of leaving, and I swore my allegiance to the sacred chipolata there and then. But in the back of my mind I knew I was a rich man: just imagine, I thought, what the papers would pay to get a hold of this one. So I decided to lie low and bide my time.

I adapted to my new life quickly. A beautiful chalet was built for me in the village, and within weeks a wife had been allocated to me to keep it clean and its refrigerator amply stocked with chunks of wild boar. And I soon learned the true feelings of these people. Regularly, at one o'clock after midnight, a tapping at the kitchen door would announce the clandestine arrival of the village youth, keen to hear my adventurous tales of life in western lands. "Is it true what we hear," they would plead, "about democracy, capitalism and Baywatch? Can such things really be?"

"My children," I replied one night, "All these wondrous things and more exist in the world beyond the mountains. I can bring them to you. But first you must help me escape."

"Escape!" they cried in unison (Unison was rather taken aback by this), "Surely you know that's impossible?! The entire valley's surrounded by a quantum field that forces matter particles through an interphase arc of 50 per cent! Hadn't you noticed the purple tint?"

"Purple?" I replied, "I found it more a rose." But my clever social irony went unnoted. "You have much to learn about our ways," I added hastily. "Systems analysts might well say that 'for all problems there are technological solutions,' but, as all good saboteurs say, 'for all technological solutions there is an off-switch'. On the morrow I will ascend the eastern mountain, and when I give the signal you must disable the village power plant long enough for me to pass through the field unharmed. You will know the signal when it happens. Be brave, children. Listen not to the nagging doubts and parental enquiries that are a natural part of any revolution. When I return you will see that all I have promised is good and true: tomorrow you will eat hamburgers."

My inspiring speech worked wonders. Readily they agreed to my plan and set about the details of their involvement. The power plant was an enormous rhododendron sited just metres away from the mayor's parlour between the turnip patch and the rhubarb penitentiary. Don't ask me how this worked, but all it took was a few bags of lime to render the whole village powerless. The next morning I climbed the eastern mountain and gave my signal (I lit a cigar); sure enough, the purple glow before me vanished and I walked across just as easily as I had walked away from Edith MacGreuger ten years previously upon the shock revelation of her secret passion for Pixel the gunslinger on the Sinclair ZX81.

I returned in a week, the journalists of the world united behind me. Imagine my surprise, dear reader, when we crossed the unprotected boundary to find an empty valley, entirely devoid of any signs of its previous inhabitation. Only Terrance the turkey remained (he had always been stubbornly territorial), still gobbling the hour at seventeen minutes past and greeting humans with his peculiar - yet strangely aesthetic - arrangement of droppings.

And that was where my story had ended until two days ago in a West End McDonalds: who should serve me up my special edition Bambi burger but a red-capped Dwietzgein Finklepompen himself. On the discovery of my escape, he explained, after pointing out this week's competitive shake prices, the village council had called an emergency meeting to vote on immediate action. In the end they had decided on plan D and moved to London to seek employment in the fast food industry. All they had ever wanted, he emphasised, was obscurity, and no-one ever noticed you in that profession.

edit

The ZX Spectrum lives on...

...if anything, it's getting stronger. Over the past few years I've been on something of a journey. It all started in 1994 I think, when I bought a copy of Gerton Lunter's **Z80** for my ageing 286 and started reliving the 'Spectrum experience' on its monochrome monitor. Sluggish on that particular machine though it was, Z80 positively flew when I upgraded to a second hand 486 two years later. When I bought my first Pentium in late 1998, however, it stopped altogether, protesting that the computer I was trying to run it on was simply too fast. That was also the time when I made my first connection to the Internet...

When I first published **ZX Format** on the web (in the year 2000) I was still very firmly in 'retro-mode,' overwhemled by the sheer amount of emulators and Spectrum software available on the net, yes, but viewing this all ultimately as just a number of people coming together to speak fondly of their past. The subtitle of my site was *Remembering the ZX Spectrum*. But then I really started learning. I discovered comp.sys.sinclair first of all - and that then alerted me to the existence of the demo scene, which I started then to explore with increasing amazement. I discovered the trade in Spectrum hardware at **ebay** and the range of new devices being developed for the machine today: the +3e hard disk interface and ROMs, the Proface PC keyboard interface, the new Spectrum+ wearproof keyboard membrane; to name but a few. I discovered Spectrum classics being remade as modern PC games and vice versa. I discovered endless software projects - for the PC and the original machine itself. I discovered the eastern European clones and their tremendous contribution to the longevity of the Spectrum spirit. And very quickly I began to realise that my plea for the Spectrum to be remembered was more than a little superfluous, for with all this going on, there was no danger of it being forgotten whatsoever.

So the subtitle of **ZXF** is *Spectrum Computing Today*, which is exactly what I want this magazine to reflect. At the cutting edge of computing technology some might consider the likes of the ZX Spectrum best only remembered, perhaps through an ocassional game of Manic Miner on an emulator; but this is in fact an active and developing scene - no longer just a thing of the past for me - and remembering is only part of what it's all about.

I want to learn more about the ZX Spectrum, that special little machine that I grew up with and continue to enjoy. It doesn't matter that it's old: I don't expect it - or desire it - to be 'state-of-the-art' anymore. And the way I personally learn best about something is to write about it. So here is ZXF: my small contribution to the Spectrum world and the next step in my journey.

Colin Woodcock

mail@cwoodcock.co.uk

q a z p l and *m*), however this requires a special test tape to be inserted and played, on which I can find very little information (*possibly* it's the test tape you can download at **ftp://ftp.worldof spectrum.org/ pub/sinclair/utils/Test Tape.tzx.zip**, but I'm not at all sure of this).

When adjusting the azimuth alignment screw, try to avoid using a magnetised screwdriver; this - over time - could result in the heads becoming magnetised - another possible source of loading problems. Avoiding magnetised screwdrivers is actually easier said than done, since most screwdrivers these days *are* magnetised. You can of course demagnetise heads with this problem using a cassette head demagnetiser (Maplin, for example, sell these at about £2.99 each).

Another common problem, one which can cause the whole tape unit to stop working altogether, can be caused by the earthing screw. Shown at point D in the picture on the previous page (the screw head is on the reverse side of the PCB), this conducting screw passes earth from the chasis of the tape deck to the printed circuit board. If the screw works loose you are likely to experience considerable loading problems; if it works loose to the extent that it no longer makes electrical contact (or if you or one of your Spectrum's previous keepers have replaced the screw with a non-conducting one) the unit will not work at all. Give it a tighten (and make sure it conducts) and, if this was your problem, all should be well again.

Replacing the cassette player

If all else fails you can of course replace the entire cassette deck, using one from another +2 or by buying a new unit from **Sintech**. This is a fairly straightforward task; the unit is secured to the case with six self taping screws and a seventh screw secures the power LED (shown in the top left corner of the main picture). Connection to the main +2 board is via a five pin connector. Decks do vary from issue to issue (variations occur, for example, in the PCB layout and the cassette gearing system), but these features should remain constant (and are the only ones you need worry about for the purposes of replacement).

Cassette PCB wiring terminals

301 - motor control (play, FF, RW)
302 - motor power (negative)
303 - as 301 plus motor power (positive)
304 - 5 pin connector: +5v (also to LED)
305 - 5 pin connector: Play (ear)
306 - 5 pin connector: Ground (also to LED)
307 - 5 pin connector: Record (mic)
308 - white (core of record headcable)
309 - red (core of record headcable)
310 - white (core of play head cable)
311 - red (core of play head cable)

*Adapted from information at **www.8bit.ht.st**.*
***Note:** on my +2A, 310 & 311 colours are reversed.*

Finally, if you're feeling brave and if none of the above suits, you *can* have a go at wiring in an external tape recorder. This isn't something I've done myself, but it seems straightforward enough, from the few discussion board postings I've found that describe the process; of the four wires leading from the cassette PCB to the five pin main board connector, B and C (see main picture) carry the ear and mic signals respectively: from these you could attach 3.5mm (mono) jack leads. But be careful: on my +2A these wires are coloured blue (ear) and white (mic), however another of those variations between decks concerns the wiring colours, so this may not be the case for yours. The relevant terminals (305 for ear, 307 for mic; not forgetting also, of course, 306 for ground) are labelled, however, so finding the right wires shouldn't be too difficult.

And just in case we need to be clear on this, you attempt all these wonderous things at your own risk entirely. Ok? Enjoy!

*Thanks to **Jeff Braine** and **Cliff Lawson** for their help in compiling this article.*

new

Retro's not what it used to be

> New look for Retrospec

The site regarded by many as *the* place on the web for game remakes has had itself a makeover. The redesigned **www.retrospec.org** launched on 18 April and has taken a move away from its exclusively Spectrum roots towards the 8-bit scene more generally (many of its existing titles, after all, were released in other formats originally).

Of the many games available for free download, the very latest addition is Graham Goring's remake of Raffaele Cecco's **Cybernoid 2** (see page 10 for a full review of this title). There are also a few new screenshots to drool over of Jeff Braine's **SabreWulf** remake - still under development, but looking absolutely gorgeous (and not to be confused with Kieran and Declan Sandwell's remake of the same title reviewed on page 11).

Above: The new-look Restrospec: damn those guys are good.

Below: SabreWulf - it just looks too good to be true. Tell me it's real. Please...

Harrier Attacks

> Durell classic remade

Pavel Dovgaluk has brought Durell's *Harrier Attack!* to the PC. A near exact facsimilie of the Spectrum original, the new version only strays beyond eight colours to include a scan of the original cassette inlay cover. Ultra smooth scrolling and a complete absence of colour clash, however, are the subtle signs of careful and loving improvement. So you can now fly your plane behind a cloud... and not turn white. Progress takes on many forms. Download it at **http://harrierattack.narod.ru/**

exp

The Plus 2 Tape Deck

Not much has been written, it appears, about the +2 integral tape deck. Ok, so it's not the most inspiring of subjects, perhaps, but if you're a +2 user then a faulty casette recorder can mean a pretty much useless computer if you're unfamiliar with this device. Here we take a look at Amstrad's main 'upgrade feature' to Sir Clive's 128k machine.

A built in tape recorder was hinted at by Amstrad right from the time of its purchase of the Sinclair brand name in April 1986, Alan Sugar himself commenting on a "glued on" deck as a possible future feature. This was no enormous surprise; Amstrad's own main competitor to the Spectrum, the CPC 464, had been sporting a built in tape player of its own since its release in 1984. The +2, when it arrived, looked remarkably similar to this computer.

The Amstrad CPC 464

If comments posted to newsgroups and forums are anything to go by, the +2 tape deck was not a popular device. Examining the new machine for the first time at the 1986 PCW show, **Crash**'s Simon Goodwin described the deck then as "rudimentary," whilst Graeme Kidd (editor at the time) wrote that it looked as though "it might first have featured in a cheapo car stereo set-up". Despite Amstrad's experience with built in tape players, the +2's device was 50 per cent slower (rewinding) than the 464's deck and lacked the 464's tape counter. There was, of course, no volume control and there was no auto-stop to protect the deck from damage from tapes left by themselves to forward/rewind.

And there was no means of connecting an alternative, external player to get around these problems. The +2A (and +2B), very different internally from the original +2, did have a jack socket labelled TAPE/SOUND at the rear, however this was actually the separate sound output for machines connected to monitors rather than TVs; on the +3 disk drive model - virtually identical internally to the +2A - this port did indeed also allow an external tape recorder to be connected, however on the

The Spectrum +2A

+2A (which appeared, of course, after the +3) this feature was not included and the labelling of the port is therefore confusing and misleading.

Tape loading errors experienced by +2 owners aren't necessarily the fault of the machine's tape deck alone. Amstrad's redesign of the actual Spectrum innards was distinctly unsympathetic to many early Spectrum games, the +2A and +3 ROMs being particularly bug-ridden and rendering many early titles instantly incompatible. An external tape player will do nothing to cure

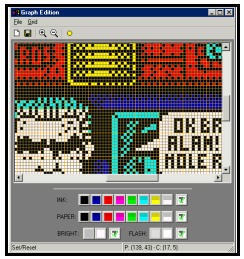
Graphics galore

> New editor in alpha

Jaime Tejedor Gómez, otherwise known - I'm given to understand - as **Metalbrain**, has released version 0.4 of his new Spectrum graphics editor for the PC, ***SevenuP***. A fair way from completion it might be, but SevenuP - a Windows based program - looks extremely promising indeed. Already accepting the standard .SCR screen$ file format, this is a serious editor for the creation of new Spectrum art. SevenuP even adds in the appropriate colour clash as you draw.

Announcing the alpha in **comp.sys.sinclair** some weeks ago, Metalbrain described some of his plans for future versions, which includes support for sprites and animations. SevenuP is available for download for both Windows and Linux; respectively these can currently be found at **http://eqquinox.com/usuarios/metalbrain/speccy/SevenuP-v0.1.ziP** and **http://eqquinox.com/usuarios/metalbrain/speccy/SevenuP-dyn-v0.1.bz2**

Meanwhile, **Alexander Shabarshin** has just released version 1.1 of his DOS based Spectrum graphics emulator, **SCRED** (SCR-EDitor), which, along with the C++ sources, can be downloaded from **http://shaos.ru/nedopc/zx/index.htm** at a mere 55kb on the road. Choice is our bounty. Now can someone please tell me how to convince my PC that something ending in .SCR is not necessarily a screensaver**?**



< SevenuP

The King of Crap

> CSSCGC results are in

The winner of the **comp.sys.sinclair** Crap Games Competition (CSSCGC) 2001 has finally been announced. Hurrah! Just when the regulars were starting to wonder what had become of this, the sixth annual celebration of the standard of Spectrum programming most infamously established by the **Cascade Cassette 50**, this year's host - Adam D Moss - bounced in to declare **Fire Electric Pen** by Joe MacKay the current champion of Spectrum smelliness. Says Judge Adam of Fire Electric Pen, *"the game combines disarming Engrish with a fundamentally appalling idea realized very frustratingly "*

Runners up this year were Tomaz Cedilnik's **Wild West Head Hunter** (*"The first entry of the year's compo to promise so much and deliver laughably little, and one of the very best submissions in that vein"*) and Pablo & Jaime Tejedor's **Games With Frontiers**. Download the lot from **http://www.ygv50.dial.pipex.com/csscgc/**. Previous years' entries can be accessed from **http://homepages.enterprise.net/cavan/ysac/cgi-bin/csscgc.cgi**, and if you're tempted to have a go in the 2002 competition, you can find an online guide to creating a crap game at **http://www.unsatisfactory.freeserve.co.uk/crap.html**.

It's not escaped the attention of many CSSCGC players that some of the competitors over the years have shown blatent disregard for the rules of this sport, turning in entries that are actually quite good. One such observer is Chris Cowley (author of vbSpec) whose new site, **Speccy Game 2002**, aims to put all this talent to a use. So far the only entry for the competition is Chris' own **Bastris** (listing on page X), but I gether there's time yet to submit a game - so get programming and submit your entries at **http://freestuff.grok.co.uk/game-compo/**.

MOVE "C:" OUT

and then remap the drive letter to another one. In fact, in the current +3e ROMs, it's only possible to map drives to two partitions at a time (although you can use any letters you like); this may be resolved in a future version.

Can you use a +3e hard disk alongside a Plus D/Disciple interface and floppy drive system?

I don't know anyone who's tried this, so I can't say for sure, but I think the Plus D interface that was designed for the +3 should work.

I can see from a picture on your web site that you use an external 3.5 inch floppy alongside your hard disk and the original 3 inch Amstrad drive - what interface and system did you use for this then?

I just plugged it in to the "drive B:" connector on the back of the +3! This will just work as long as it's not a high-density (1.44Mb) drive. There's also some software on the site that allows you to format 3.5 inch disks up to 828K, and also to copy files to and from standard PC DOS disks.

Is powering the hard disk difficult? What sorts of adapters/PSUs do you need?

The easiest thing is to get a power supply from a PC case - even if you have to buy a new case, it's not too expensive. You can normally run two hard disks and an external floppy drive from the same PSU.

Well it all sounds like an immense amount of work has gone into this. Just how long have you been working on this little lot for?

Well, the idea first came about after chatting with John Garner and Dominic Morris at the last NSSS which was November '98, so I suppose it must be about 3 years! Not to say that I've exactly been working on it non-stop, I just tend to do concentrated bursts of stuff and then nothing for ages. But I'd hate to think just how many hours have gone into it ;)

You've given a few hints as to some possible future ideas for the +3e - any other plans as to how this system might be developed?

I've got plenty of ideas, but how many of them will ever reach fruition, I don't know! One thing I would like to do is allow the 128K menu system to be extended so that you could (say) load an application program and then have it available from the menu in the same way as BASIC or the Calculator. It would also be nice to add support for CP/M.

Other thoughts are support for CDROMs and other devices like that, although this would require a full 16-bit interface to be made.

Have many people constructed the +3e? What sort of feedback have you received?

Well I know of at least a dozen, and have also heard that a group of Spanish users were getting together to build a batch between them, so I would imagine we're probably talking 20+ at the moment. Certainly less than 100! How many are using the ROMs without the hard disk interface, I couldn't say.

The feedback I've received has been really positive, mostly just to say they've built the system, but I have had a lot of useful feedback in the form of requests, comments and bug reports etc. Almost all the emails I receive are from non-UK Europeans, particularly the Spanish (so much so, that I now produce a Spanish version of the ROMs, and the website has also been translated).

One final question - what does the 'e' stand for?

Um, enhanced or extended I think. Whatever you prefer!

load

Cybernoid 2 (PC)

Programming: Graham Goring
Graphics: John Blythe
Level design: Russell Hoy
Music: Will Morton
Download it from: www.retrospec.org

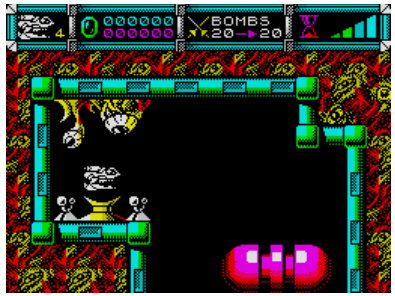
I have to confess, my early Spectrum days were almost at an end when Raffaele Cecco's sequel to Cybernoid hit the shelves in Autumn 1988. My planned SAM Coupe was starting to occupy my thoughts pretty seriously by this stage and this release just passed me by completely. When I downloaded this remake I therefore had to download the original from WOS also, just to see what it was like.

Which is where I encountered the first rather startling thing about this remake - it *feels* almost exactly the same as the original. Not being a games programmer myself, I don't know how easy or difficult this is - but I was well impressed all the same.

In the original Cybernoid your job was to retrieve stolen cargo plundered by nasty pirates; Cybernoid 2 sees those blighters' return and yet more goods to be recovered. In a nutshell your job is to fly around the five levels of the pirates' base and shoot pretty much everything you see, not forgetting, of course, to pick the cargo up along the way. Your ship is positively brimming with weapons, from rockets to heat seeking missles to bouncing bombs - all of which, mercifully, are replenished each time you die.

Graham Goring's remake is programmed in Blitz Basic (fast establishing itself as a favourite language for remakes, although some CSSers have reported problems running Blitz games on their systems). The graphics are colourful and detailed, whilst remaining faithful to the original. Animation is smooth and groovy. But where Cybernoid 2 really scores for me is with its music and sound effects. Will Morton's funky *Ba badaba ba badaba ba bum* that accompanies your efforts as you fly from screen to screen stays with you long after you've shut the game (and the computer) down, and I particularly like the twangy 'ping' that your laser bolts make when they bounce off the metal walls.

Cybernoid 2 is a fairly tough game for lightweights like myself; that hasn't stopped me coming back to it time and time again, however. And I can see this continuing until the game is done, which means it had better make itself at home on my hard disc; it's going to be around for some time.



The Spectrum original and the remake.

VERDICT	
Graphics	8
Sound	9
Playability	8
Addictiveness	8
Overall	**8**

+3 disk, you can run it simply by typing SPECTRUM "chaos.z80" for example. This only works with 48K snaps at the moment, and there may be some bugs, but it does generally do the job and I'm working on improvements.

Finally, I've extended the Speccy's "streams and channels" facility: normally this only works with the screen, printer and keyboard (so you can use PRINT #3 to output to the printer, for example), but now there are extra channels for input/output to memory, variables, disk files and text windows. Probably the most useful of these are the disk file channels (microdrive and most other disk systems have this facility, but not the +3...) and text windows.

As you might expect, text windows can be defined to take up any area of the screen, and you can choose the character size (from 3-8) with extra double-width, double-height and reduced height options. All these size combinations mean you can fit anything from 16x12 to 85x32 characters on the screen! Text can be justified or centred automatically if you like, and there's plenty of other facilities, all accessed by PRINTing special codes to the window streams.

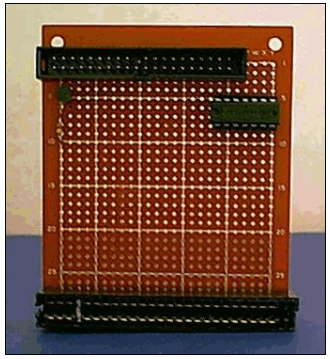
Windows on the Spectrum! What sort of uses do you think this could be put to?

Well, that's up to others! I hope eventually to replace the 128K editor with something a bit more QL-like, with one window used for the listing, one for input and another for output.

Do the +3e ROMs sort out the compatibility issues of the original +3/+2A ROMs with older Spectrum software?

At the moment, no they don't actually improve compatibility, but hopefully they don't make things worse. I have experimented by replacing the modified 48K BASIC ROM with the one almost identical to the original ROM; this improves compatibility with 48K software (better than any 128K Spectrum), but unfortunately breaks several +3 programs which check changes made to the ROM to tell which machine they're running on (including the Infocom adventure interpreter ZXZVM which is my all-time favourite piece of +3 software!)

Right then; the hard disk interface: is this something you sell?



The Spectrum +3e hard disk interface: it's quite simply really...

Absolutely not! I'm not a hardware expert, and my soldering skills are sadly lacking, so I'm afraid anybody who wants a hard disk interface is going to have to build their own, or find somebody else to do it for them. On the plus side, the interface is extremely simple and has minimal connections, so this isn't as arduous as it might be.

I'm aware a lot of people simply aren't able to build even this "simple" interface, however, so I'm looking into the possibility of getting something properly manufactured. It's early days, though, so don't expect anything soon.

The interface - as I understand it - fits onto the Spectrum's edge connector - and into that you can plug a hard disk.

That's right, although it's also possible to make one that plugs into the socket containing the Z80, and so have the entire interface inside the +3 case.

What sort of hard disks are compatible and where can you get them from?

Theoretically any 3.5" IDE hard disk should

List

Sorry, but this just wouldn't be a Spectrum magazine without a program listing. That's my baggage, ok? Welcome to BASTRIS (the name works on so many levels), by Chris Cowley, his own entry in his own **Speccy Game 2002** competition. Think you can do better? Well you just make your way to **http://freestuff.grok.co.uk/game-compo/** and prove it buddy.

```
# BASTRIS v0.1
#
# (c) 2002 Chris Cowley
# February 2002
#
# Use zmakebas from http://
     rus.members.beeb.net/
     zmakebas.html to strip out
# the '#' comments and turn this into
     a Speccy .TAP file!

 10 REM BASTRIS (c)2002 Chris Cowley
 20 GOSUB 9700
 30 GOSUB 9500
 40 GOSUB 4700
 50 LET Piece=INT(RND*7)+1: LET
     rot=0
 60 GOSUB 3900 + Piece * 100 + Rot * 10
 70 LET y=1: LET x=14: LET newx=x:
     LET IsBottom=0
 80 GOSUB 3800
 90 GOSUB 3100
100 GOSUB 3000
110 IF IsBottom AND y=1 THEN GOTO 200
120 IF IsBottom THEN GOSUB 2000:
     GOTO 50
140 GOSUB 3850
150 LET y=y+1: LET x=newx
160 GOTO 80

#
# Game Over
#
200 PRINT AT 9,10;INK 2; PAPER
     1;"\b\o\o\o\o\o\o\o\o\o\c"
210 PRINT AT 10,10;INK 2;"\o";INK
     7;"Game Over";INK 2;"\o"
220 PRINT AT 11,10;INK 2; PAPER
     1;"\d\o\o\o\o\o\o\o\o\o\e"
230 INK 6: PAPER 0: FLASH 1: GOSUB
     9800
240 IF INKEY$<>"" THEN GOTO 240
250 FOR N=1 TO 1400: NEXT N
260 GOTO 30

#
# Check for completed lines
#
2000 FOR N=1 TO 20
2010 LET Row=-1
2015 FOR M=11 TO 20
2020 IF PEEK(22528+M+N*32) = 0 THEN
     LET Row=0: LET M=20
2025 NEXT M
2030 IF Row THEN GOSUB 2100
2040 NEXT N
2050 RETURN

#
# Remove Row N
#
2100 FOR R=N TO 1 STEP -1
2105 LET Row=0
2110 FOR M=11 TO 20
2115 POKE
     22528+M+R*32,PEEK(22528+
     M+(R-1)*32)
2118 IF PEEK(22528+M+R*32)<>0 THEN
     LET Row=-1
2120 NEXT M
2122 IF NOT Row THEN LET R=1
2125 NEXT R
2130 LET Lines=Lines+1
2135 IF Lines>9999 THEN PRINT AT
     4,24;Lines: RETURN
2140 IF Lines>999 THEN PRINT AT
     4,25;Lines: RETURN
2145 IF Lines>99 THEN PRINT AT
     4,26;Lines: RETURN
2150 IF Lines>9 THEN PRINT AT
     4,27;Lines: RETURN
2155 PRINT AT 4,28;Lines
2160 BEEP .1,40
2170 RETURN

#
# Is the current piece "Bottomed Out"
     (F'NAR!)
#
3000 LET p1=x+b(1,1)+(y+b(1,2))*32
3002 LET p2=x+b(2,1)+(y+b(2,2))*32
3004 LET p3=x+b(3,1)+(y+b(3,2))*32
3006 LET p4=x+b(4,1)+(y+b(4,2))*32
3010 LET n1=p1+32: LET n2=p2+32: LET
```

List

```
3805 POKE 22528+x+b(2,1)+((y+b(2,2)
     )*32),71+Piece*8
3810 POKE 22528+x+b(3,1)+((y+b(3,2)
     )*32),71+Piece*8
3815 POKE 22528+x+b(4,1)+((y+b(4,2)
     )*32),71+Piece*8
3820 RETURN

#
# Undraw Piece
#
3850 POKE
     22528+x+b(1,1)+((y+b(1,2))*32
     ),0
3855 POKE
     22528+x+b(2,1)+((y+b(2,2))*32
     ),0
3860 POKE
     22528+x+b(3,1)+((y+b(3,2))*32
     ),0
3865 POKE
     22528+x+b(4,1)+((y+b(4,2))*32
     ),0
3870 RETURN

# Square Piece Rotations
############################
4030 LET b(1,1)=1: LET b(1,2)=1: LET
     b(2,1)=2: LET b(2,2)=1: LET
     b(3,1)=1: LET b(3,2)=2: LET
     b(4,1)=2: LET b(4,2)=2: RETURN

# Long Piece Rotations
############################
4100 LET b(1,1)=0: LET b(1,2)=1: LET
     b(2,1)=1: LET b(2,2)=1: LET
     b(3,1)=2: LET b(3,2)=1: LET
     b(4,1)=3: LET b(4,2)=1: RETURN
4110 LET b(1,1)=2: LET b(1,2)=0: LET
     b(2,1)=2: LET b(2,2)=1: LET
     b(3,1)=2: LET b(3,2)=2: LET
     b(4,1)=2: LET b(4,2)=3: RETURN
4120 LET b(1,1)=0: LET b(1,2)=2: LET
     b(2,1)=1: LET b(2,2)=2: LET
     b(3,1)=2: LET b(3,2)=2: LET
     b(4,1)=3: LET b(4,2)=2: RETURN
4130 LET b(1,1)=1: LET b(1,2)=0: LET
     b(2,1)=1: LET b(2,2)=1: LET
     b(3,1)=1: LET b(3,2)=2: LET
     b(4,1)=1: LET b(4,2)=3: RETURN

# T-Piece Rotations
######################
4200 LET b(1,1)=1: LET b(1,2)=1: LET
     b(2,1)=0: LET b(2,2)=2: LET
     b(3,1)=1: LET b(3,2)=2: LET
     b(4,1)=2: LET b(4,2)=2: RETURN
4210 LET b(1,1)=1: LET b(1,2)=0: LET
     b(2,1)=1: LET b(2,2)=1: LET
     b(3,1)=2: LET b(3,2)=1: LET
     b(4,1)=1: LET b(4,2)=2: RETURN
4220 LET b(1,1)=1: LET b(1,2)=1: LET
     b(2,1)=2: LET b(2,2)=1: LET
     b(3,1)=3: LET b(3,2)=1: LET
     b(4,1)=2: LET b(4,2)=2: RETURN
4230 LET b(1,1)=2: LET b(1,2)=0: LET
     b(2,1)=1: LET b(2,2)=1: LET
     b(3,1)=2: LET b(3,2)=1: LET
     b(4,1)=2: LET b(4,2)=2: RETURN

# L-Piece Type 1 Rotations
############################
4300 LET b(1,1)=1: LET b(1,2)=0: LET
     b(2,1)=2: LET b(2,2)=0: LET
     b(3,1)=2: LET b(3,2)=1: LET
     b(4,1)=2: LET b(4,2)=2: RETURN
4310 LET b(1,1)=2: LET b(1,2)=0: LET
     b(2,1)=0: LET b(2,2)=1: LET
     b(3,1)=1: LET b(3,2)=1: LET
     b(4,1)=2: LET b(4,2)=1: RETURN
4320 LET b(1,1)=1: LET b(1,2)=0: LET
     b(2,1)=1: LET b(2,2)=1: LET
     b(3,1)=1: LET b(3,2)=2: LET
     b(4,1)=2: LET b(4,2)=2: RETURN
4330 LET b(1,1)=0: LET b(1,2)=0: LET
     b(2,1)=1: LET b(2,2)=0: LET
     b(3,1)=2: LET b(3,2)=0: LET
     b(4,1)=0: LET b(4,2)=1: RETURN

# L-Piece Type 2 Rotations
############################
4400 LET b(1,1)=1: LET b(1,2)=0: LET
     b(2,1)=2: LET b(2,2)=0: LET
     b(3,1)=1: LET b(3,2)=1: LET
     b(4,1)=1: LET b(4,2)=2: RETURN
4410 LET b(1,1)=0: LET b(1,2)=0: LET
     b(2,1)=1: LET b(2,2)=0: LET
     b(3,1)=2: LET b(3,2)=0: LET
     b(4,1)=2: LET b(4,2)=1: RETURN
4420 LET b(1,1)=1: LET b(1,2)=0: LET
     b(2,1)=1: LET b(2,2)=1: LET
     b(3,1)=0: LET b(3,2)=2: LET
     b(4,1)=1: LET b(4,2)=2: RETURN
4430 LET b(1,1)=0: LET b(1,2)=0: LET
     b(2,1)=0: LET b(2,2)=1: LET
     b(3,1)=1: LET b(3,2)=1: LET
     b(4,1)=2: LET b(4,2)=1: RETURN

# S-Piece Type 1 Rotations
############################
4500 LET b(1,1)=0: LET b(1,2)=1: LET
     b(2,1)=1: LET b(2,2)=1: LET
     b(3,1)=1: LET b(3,2)=2: LET
     b(4,1)=2: LET b(4,2)=2: RETURN
4510 LET b(1,1)=2: LET b(1,2)=0: LET
     b(2,1)=1: LET b(2,2)=1: LET
     b(3,1)=2: LET b(3,2)=1: LET
     b(4,1)=1: LET b(4,2)=2: RETURN
4520 LET b(1,1)=0: LET b(1,2)=0: LET
     b(2,1)=1: LET b(2,2)=0: LET
     b(3,1)=1: LET b(3,2)=1: LET
     b(4,1)=2: LET b(4,2)=1: RETURN
4530 LET b(1,1)=2: LET b(1,2)=0: LET
     b(2,1)=1: LET b(2,2)=1: LET
     b(3,1)=2: LET b(3,2)=1: LET
     b(4,1)=1: LET b(4,2)=2: RETURN

# S-Piece Type 1 Rotations
############################
4600 LET b(1,1)=2: LET b(1,2)=1: LET
     b(2,1)=3: LET b(2,2)=1: LET
     b(3,1)=1: LET b(3,2)=2: LET
     b(4,1)=2: LET b(4,2)=2: RETURN
4610 LET b(1,1)=1: LET b(1,2)=0: LET
     b(2,1)=1: LET b(2,2)=1: LET
     b(3,1)=2: LET b(3,2)=1: LET
     b(4,1)=2: LET b(4,2)=2: RETURN
4620 LET b(1,1)=2: LET b(1,2)=1: LET
     b(2,1)=3: LET b(2,2)=1: LET
     b(3,1)=1: LET b(3,2)=2: LET
     b(4,1)=2: LET b(4,2)=2: RETURN
4630 LET b(1,1)=1: LET b(1,2)=0: LET
     b(2,1)=1: LET b(2,2)=1: LET
     b(3,1)=2: LET b(3,2)=1: LET
     b(4,1)=2: LET b(4,2)=2: RETURN

#
# Initialize Game Screen + Variables
#
4700 RANDOMIZE
4705 INK 0: BRIGHT 0: CLS
4710 PRINT AT 1,10; INK 1;"\f"; INK
     0;"\a\a\a\a\a\a\a\a\a\a"; INK
     1;"\f"
4715 FOR N = 2 TO 20: PRINT AT N,10;
     PAPER 1;" ";PAPER
     0;"\A\A\A\A\A\A\A\A\A\A";PA-
     PER 1;" ": NEXT N
4720 PRINT AT 21,10;INK
     1;"\D\O\O\O\O\O\O\O\O\O\E"
4725 PRINT AT 2,23; INK 5; BRIGHT
     1;"\B\O\O\O\O\O\C"
4730 PRINT AT 3,23; INK 5; BRIGHT
     1;"\O";INK 7;"Lines"; INK
     5;"\O";AT 4,23; INK 5;"\O"; INK
     7; BRIGHT 0; "00000"; INK 5;
     BRIGHT 1;"\O"
4735 PRINT AT 5,23; INK 5; BRIGHT
     1;"\D\O\O\O\O\O\E"
4740 LET Lines=0: Dim b(4,2)
4745 INK 7
4750 RETURN

#
# Front Screem
#
9510 BORDER 0: PAPER 0: INK 7: BRIGHT
     1: FLASH 0: CLS
9520 PRINT INK 2;"\o\o\o\c \b\o\o\c
     \b\o\o\c \o\o\o \o\o\o\c \o\o\o
     \b\o\o\c"
9522 PRINT INK 6;"\o \o\o \o\o   \o
     \o \o \o \o"
9524 PRINT INK 4;"\o\o\o\p \o\o\o\o
     \d\o\o\c \o \o\o\o\p \o
     \d\o\o\c"
9526 PRINT INK 5;"\o \o\o \o\o  \o \o
     \o \o \o   \o"
9528 PRINT INK 1;"\o \o\o \o\o\f \o
     \o \o \o \o\f \o"
9530 PRINT INK 3;"\o\o\o\e \o \o
     \d\o\o\e \o \o \o \o\o\o
     \d\o\o\e"
9540 INK 6
9542 PRINT AT 8,14;"Keys:";AT
     10,15;"\I \M"; AT 12,11;"\G\K
     \L\H"; AT 14,15;"\J \N"
9544 PRINT AT 17,4;"A "; CHR$(34) +
     "SpeccyGame 2002" + CHR$(34) + "
     Entry"; AT 18,9; BRIGHT 0;"By
     Chris Cowley"
9546 INK 7
9550 PRINT AT 21,5;"Press any key to
     start"
9560 IF INKEY$ <> "" THEN GOTO 9560
9565 RESTORE 9600
9570 FOR N=1 TO 158
9572 READ X,Y
9574 FOR M=1 TO X: IF Y > -12 THEN BEEP
     .011,Y
9576 IF INKEY$ <> "" THEN RETURN
9578 NEXT M
9580 NEXT N
9585 GOTO 9565

### Tune Data ###
9600 DATA
     8,0,4,12,4,15,4,6,8,5,4,12
9602 DATA
     8,0,4,12,4,15,4,6,8,5,4,12
9604 DATA 8,0,4,12,4,15,4,6,8,5
9606 DATA
     4,0,8,3,4,0,4,2,4,0,4,2,4,3,4
     ,2
9610 DATA
     8,0,4,12,4,15,4,6,8,5,4,12
9612 DATA
     8,0,4,12,4,15,4,6,8,5,4,12
9614 DATA 8,0,4,12,4,15,4,6,8,5
9616 DATA
     4,0,8,3,4,0,4,2,4,0,4,2,4,3,4
     ,2
9620 DATA
     8,5,4,17,4,20,4,11,8,10,4,17
9622 DATA
     8,5,4,17,4,20,4,11,8,10,4,17
```